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BOTANY.

Silviculture.¹—Silviculturists and others interested in forest management will welcome the second part of Professor Mouillefert's comprehensive treatise which is now out. The first part having considered in much detail from the forester's point of view the most important tree species, this second part deals especially with the management and exploitation of trees in assemblages or forests. After defining precisely the terms used, the author considers most comprehensively the principal methods of developing and harvesting the two forms of wood, high forest and coppice, and the application of these methods to the principal species of trees; gives advice as to what to seek in any given case, and describes the nature and amount of the product to be obtained, giving volume curves, directions for developing a forest working plan, calculations of annual revenue, and so on. Special chapters deal with the cultivation of osiers for the draining of soils and with the culture of truffles. The chief modes of cropping and marketing forest products are also taken up.

While special parts, such as rules for forest management and the tables of annual returns, are based upon conditions different from our own (it being possible by reason of the centuries of forestry practice in France to lay down rules of practice and estimate yields much more definitely than with us) nevertheless the general aspects of the subject, the principles of the science and art of silviculture are set forth so clearly and simply that the book is bound to be of general interest to foresters and students of forestry in this country. It will be particularly helpful in making clear to many certain sides of the subject, such as the mathematics of forest measurements, which, as they are often set forth in works on forestry, are not likely to be easily understood.

C. S. S.

Notes.—Loeb's St. Louis address on the recent development of biology is printed in *Science* of December 9th.

An important addition to the rather abundant recent literature of apogamy is made by Strasburger, in a study of *Alchemilla* published in the opening number of Vol. 41 of the *Jahrbücher für wissenschaftliche Botanik*.

¹ Mouillefert, P. *Traité de Sylviculture*—Part 2—*Exploitation et Aménagement des Bois*. Paris, Alcan. 1904. 12mo, 476 pp., 10 pls. 97 figs.

An account of the "blaze-currents" of vegetable tissues, by Waler, forms part of Vol. 37, No. 257, of the *Journal* of the Linnean Society, Botany.

A paper on the absorption of electro-magnetic waves by living vegetable organisms, by Squier, has been reprinted from General MacArthur's *Report* to the War Department on the Military Manœuvres in the Pacific Division, 1904.

A considerable discussion of the use of copper for the treatment of polluted drinking water is contained in the *American Journal of Pharmacy* for December.

The "summer-fall" of the leaves of Canary Island plants forms the subject of a note by Vahl in Heft 2 of the *Botanisk Tidsskrift* for 1904.

An interesting study of sandal seedlings is published by Barber in *The Indian Forester* for December.

Papers on myrmecophilous plants by Morteo and Villani are contained in Vol. 18, Fascicle 10-12 of *Malpighia*.

Methods of surveying vegetation on a large scale are discussed with illustrative diagrams, by Oliver and Tansley in *The New Phytologist* of December 20.

Certain traumatic floral anomalies, and their heredity, are discussed by Blaringhem in the *Bulletin* of the Muséum d'Histoire Naturelle of Paris, 1904, No. 6.

A paper on the structure of the starch grain, by Denniston, has been separately issued from Vol. 14 of the *Transactions* of the Wisconsin Academy of Sciences.

An anatomical study of *Anemiopsis californica* is published by Holm in *The American Journal of Science* for January.

A paper by Drabble on the anatomy of the roots of palms forms Vol. 6, Part 10, of the current botanical series of *Transactions* of the Linnean Society of London.

An interesting presentation of some of Burbank's experiments is given by Jordan in *Popular Science Monthly* for January.

A progress report on the strength of structural timber, by Hatt, forms *Circular No. 32* of the Bureau of Forestry, U. S. Department of Agriculture.

A further study of the "popping" of Indian corn, by Professor Storer, is contained in Vol. 3, Part 4 of the *Bulletin* of the Bussey Institution.

Heckel publishes a paper on *Solanum commersoni* and its variations as bearing on the origin of the cultivated potato in the *Revue Horticole* of Marseilles for November.

The banana in Hawaii forms the subject of *Bulletin No. 7* of the Hawaii Agricultural Experiment Station, by Higgins.

Bulletin No. 88 of the Bureau of Chemistry, U. S. Department of Agriculture, is devoted to the chemical composition of apples and cider.

A paper on California olive oil, by Shaw, forms *Bulletin No. 158* of the Agricultural Experiment Station of that State.

Some nature-photograms of cross-sections of wood are published by Russell in the *Gardeners' Chronicle* of November 26.

An ecological study of Brush Lake, by Schaffner, Jennings, and Tyler, forms Vol. 4, Part 4, of the *Proceedings* of the Ohio State Academy of Science.

A "Pugillus Cryptogamarum Canadensium," by Cufino, is published in *Malpighia*, Vol. 18, Fascicle 10-12.

Under the title "Bouquet de Fleurs de Chine," Lévillé publishes a number of new Chinese species in Vol. 39, Fascicle 4, of the *Bulletin* de la Société d'Agriculture, Sciences et Arts de la Sarthe.

A second paper on new or noteworthy Philippine plants, by Merrill, forms [*Bulletin*] *No. 17* of the Bureau of Government Laboratories of the islands, dated October 1, 1904.

Part 10 of Koorders and Valetton's "Additamenta ad Cognitionem Floræ arboreæ Javanicæ" forms No. 68 of the *Mededeelingen nit 's Lands Plantentuin*.

The flora of western Australia is receiving important treatment by Diels and Pritzel in current numbers of Engler's *Botanische Jahrbücher*.

Vol. 4 of the "Flora of Tropical Africa," edited by Sir William T. Thiselton-Dyer, has recently been completed.

Several additional species of *Eschscholtzia* are described by Fedde in No. 35 of the *Notizblatt* of the Berlin Garden.

A number of new species of cacti are described from the notes of the late Dr. Weber, by Gosselin, in No. 6 of the *Bulletin* of the Muséum d'Histoire Naturelle of Paris for 1904.

An attractive book, "Abbildungen der in Deutschland und den angrenzenden Gebieten vorkommenden Grundformen der Orchideen-Arten," by Müller, with descriptive text by Kränzlin, has been issued by R. Friedländer & Sohn, of Berlin.

Some interesting test-tube cultures of orchids are detailed by Bernard in the *Revue Générale de Botanique* of Nov. 15.

A revision of *Tradescantia*, as known from Texas, is published by Bush in Vol. 14, No. 7, of the *Transactions* of the Academy of Science of St. Louis.

The prothallium of *Ophioglossum vulgatum* is described by Bruckmann in the *Botanische Zeitung* of December 15.

Regnellidium diphyllum, the type of a new genus of Marsiliaceæ, from Brazil, is described and figured by Lindman in Vol. 3 of *Arkiv för Botanik*.

An important paper on Cyanophyceæ, by Zacharias, is separately printed from Vol. 21 of the *Jahrbuch der Hamburgischen wissenschaftlichen Anstalten*.

The first part of a historical review of the origin of species by mutation is contributed by Harris to *The Monist* of October.

An important paper by Goebel on cleistogamous flowers and the adaptation theories is begun in the *Biologisches Centralblatt* of November.

The summer activity of some spring flowers is discussed by Dr. Keller in Part 2 of the current volume of *Proceedings* of the Academy of Natural Sciences of Philadelphia.

A paper on the origin and nature of color in plants, by Kraemer, is contained in the *Proceedings* of the American Philosophical Society, No. 177.

Country Life in America for December contains striking pictures of *Anemone patens nuttalliana* blooming in the snow.

A lecture by Haberlandt on the sense organs of plants is being published in current numbers of the *Naturwissenschaftliche Rundschau*.

A treatise on the transpiration of plants, by Burgerstein, has recently been issued from the press of Gustav Fischer of Jena.

Bower's St. Louis address, dealing with the relation of the axis to the leaf in vascular plants, is printed in *Science* of October 21.

Coulter's St. Louis address on the development of morphological conceptions is printed in *Science* of November 11th.

A paper on cytological technique, by Osterhaut, forms Vol. 2, No. 11 of the botanical series of *University of California Publications*.

The comparative age of the different floristic elements of eastern North America is discussed by Harshberger in a separate from the August *Proceedings* of the Academy of Natural Sciences of Philadelphia.

Westgate gives an account of the reclamation of the Cape Cod sand dunes in *Bulletin No. 65* of the Bureau of Plant Industry of the U. S. Department of Agriculture.

Certain plants of the north temperate zone are contrasted with their representatives in the high mountains of tropical Africa by Engler in the *Annals of Botany* for October.

The second section of Volume 4 of the "Flora Capensis," covering Hydrophyllaceæ to Pedalineæ, has recently been completed, with index, under the editorship of the Director of the Kew Gardens.

An interesting paper on the forest flora of the Jubbulpore district of India is published by Hole in *The Indian Forester* of November.

The botanical zones of the Madeiras are discussed by Menezes in Vol. 8 of the *Annaes de Sciencias Naturaes* of Oporto.

An account of *Liquidambar styraciflua* is contributed to Nos. 8 and 9 of the current volume of *Anales del Museo Nacional de México*, by Alcocer.

De Vries' *Trifolium pratense quinquefolium* is discussed by Tammes in the *Botanische Zeitung*, Abt. 1, of November 15.

An account of the group of peaches known as honey-peaches is given by Reimer in *Bulletin No. 73* of the Florida Agricultural Experiment Station.

An illustrated monograph of the willows of France, with classification of the other European species, by A. and E. G. Camus, has been published from the office of the *Journal de Botanique*, of Paris.

Urbina gives an account of *Pedilanthus aphyllus* in the *Boletín del Museo Nacional de México* of March last.

In the *Gardeners' Chronicle* of Nov. 5 is given, by Müller, the first partial description of some of Sprenger's hybrid *Yuccas*.

An account of the tight-chaffed wheats, "emmer" and "spelt," by Saunders, forms *Bulletin No. 45* of the Central Experimental Farm, of Ottawa, Canada.

A neatly illustrated handbook of "New England Ferns and their Common Allies," by Helen Eastman, has been issued from The Riverside Press of Cambridge.

315 Pteridophytes, of which a number are new, are noted for Isthmian America by Hieronymus in Engler's *Botanische Jahrbücher* of October 25.

A monograph of North American Ustilagineæ, by Clinton, forming No. 57 of the "Contributions from the Cryptogamic Laboratory of Harvard University," is published as Vol. 31, No. 9, of the *Proceedings* of the Boston Society of Natural History.

Arsenic in papers and fabrics, and the so-called arseno-molds belonging to the genera *Aspergillus*, *Penicillium*, and *Mucor*, are discussed by Haywood and Warren in *Bulletin No. 86* of the Bureau of Chemistry, U. S. Department of Agriculture.

Sydow's "Monographia Uredinearum," in fascicle 5 reaches the end of *Puccinia*, of which 1231 species are recognized. The contents of the volume are rendered accessible by good indexes.

A paper on Mexican Uredineæ, by Holway, is contained in *Annales Mycologici* for September.

Colletotrichum gloeosporioides, and its attacks on the pomelo, form the subject of *Bulletin No. 74* of the Florida Agricultural Experimental Station, by Hume.

Papers on Middleton Fungi—by Gates, and Fungi of Nova Scotia, a provisional list—by MacKay, have been separately issued from the *Proceedings and Transactions* of the Nova Scotian Institute of Science, Vol. 11.

Petri discusses the diagnostic value of the capillitium of *Tylostoma* in *Annales Mycologici* for September.

A third edition of Frost's "Laboratory Guide in Elementary

Bacteriology" has been issued from the Macmillan press, and gives a most serviceable foundation for a year's work.

An interesting article on invisible micro-organisms, by Dorset, is reprinted from the *Twentieth Annual Report* of the Bureau of Animal Industry, U. S. Department of Agriculture.

Volume 1 of Ward's "Trees: a Handbook of Forest Botany for the Woodlands and the Laboratory" (Cambridge, the University Press, 1904) deals with buds and twigs, and constitutes one of the best of the winter manuals yet published. In the second part of the volume, keys, figures, and descriptions facilitate the determination of British species.

An annotated account of trees and shrubs tested in Manitoba and the Northwest Territories, by Saunders, forms *Bulletin No. 47* of the Central Experimental Farm, at Ottawa, Canada.

In *Nature* of November 24, Mr. H. Charlton Bastian has again taken up the question of heterogenesis.

A contribution to the study of fermentation, by Twight and Ash forms *Bulletin No. 159* of the Agricultural Experiment Station of California.

An elaborate monograph of Hungarian Gasteromycetes, by Hollós, has been issued in German translation from the Weigel Press of Leipzig.

A characteristic colored plate of *Amanita muscaria* is given in *The American Botanist* of October.

A good "fairy-ring," apparently of *Agaricus arvensis*, is figured in *The American Inventor* of January 1, 1905.

Bulletin No. 75 of the Florida Agricultural Experiment Station is devoted to a discussion of potato diseases, by Hume.

A new catalogue of the plants cultivated in the botanical garden at Buitenzorg, by Hochreutiner, is begun in *Bulletin de l'Institut Botanique de Buitenzorg*, No. 19.

An account of the cultivation of *Papaver somniferum*, and the production of opium, in the United States is given by Richtmann in the *Pharmaceutical Review* of November.

A study of the chemical composition of some tropical fruits and their products, by Chace, Tolman, and Munson, forms *Bulletin No. 87*, of the Bureau of Chemistry, U. S. Department of Agriculture.

A popular account of Christmas fruits and their sources is published by McFarland in *Country Life in America* for December.

Southern evergreens and their commercial utilization are discussed by Caldwell in *Country Life in America* for December.

Dr. Sherman's bulletin on Gutta Percha and Rubber of the Philippine Islands is being reprinted in *The Far Eastern Review*, of Manila, beginning with the issue of September.

According to No. 5 of the current volume of the *Bulletin du Jardin Impérial Botanique de St. Pétersbourg*, the living collections of plants at that institution in 1903 numbered 34,887 species and varieties, of which 27,516 required the shelter of plant houses.

An account of Bauhin's herbarium, with determinations by A. P. de Candolle, is published by Casimir de Candolle in Vol. 4, No. 3, of the *Bulletin de l'Herbier Boissier*.

M. Correvon, of Geneva, has recently issued an account of the first Congress of Alpine Gardens, held at the Rochers de Naye in August.

The Journals. — *Botanical Gazette*, November: — Jeffrey, "A Fossil Sequoia from the Sierra Nevada"; Shull, "Place-Constants for *Aster prenanthoides*"; Robinson, "A New Sheep-poison from Mexico"; Nelson, "Some Western Species of *Agropyron*"; MacMillan, "Note on some British Columbian Dwarf Trees"; Jeffrey and Chamberlain, "Celloidin Mechanique"; and Life, "An Abnormal Ambrosia."

The Bryologist, November: — Fink, "Further Notes on Cladonias — IV"; Grout, "Hepatics with Hand Lens."

Bulletin of the Torrey Botanical Club, October: — Bessey, "The Chimney-shaped Stomata of *Holacantha Emoryi*"; Kellicott, "The Daily Periodicity of Cell-division and of Elongation in the Root of *Allium*"; Emerson, "Relationship of *Macrophoma* and *Diplodia*"; Rydberg, "Studies on the Rocky Mountain Flora — XII."

Bulletin of the Torrey Botanical Club, November: — Cushman, "Desmids from Newfoundland"; Horne, "An Anomalous Structure on the Leaf of a Bean Seedling"; House, "The Nomenclature of *Calonyction bona-nox*"; Murrill, "The Polyporaceæ of North America — IX"; Britton, "On *Pisonia obtusata* and its Allies."

Journal of the New York Botanical Garden, November: — Britton, "Report on Exploration of the Bahamas."